(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 362 815 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.11.2003 Bulletin 2003/47

(51) Int Cl.[7]: **B65H 23/038**, B65H 23/02

(21) Application number: **03009792.7**

(22) Date of filing: **09.05.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **14.05.2002 JP 2002138314**

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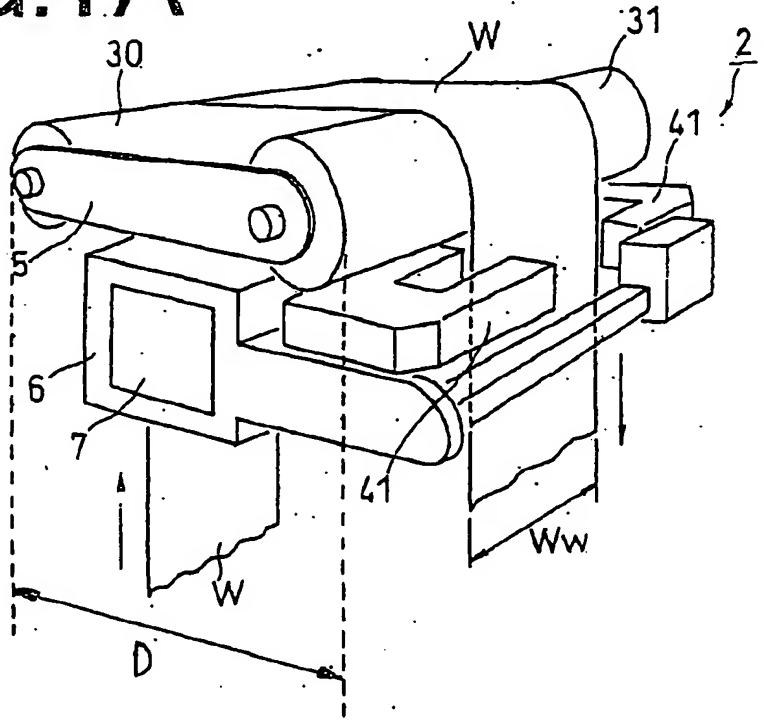
(54) Web guider

(57) A web guider comprising a movable section (5) that has an inlet roller (30) for picking up a web, an outlet roller (31) for releasing the web, and a curved rail (50); and a fixed section (6) that has a guider for guiding the curved rail (50) and a motor (M) for providing a driving force for swinging the movable section (5); wherein the motor (M) transmits the driving force through a driver (61) of the motor (M) to a follower (61) of the curved rail (50), an orientation of the movable section (5) is changed by changing a position at which the driver (61) contacts the follower (61).

FIG.1A



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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION:

[0001] The present invention relates to a web guider capable of correcting the path along which a web is transferred.

DESCRIPTION OF THE RELATED ART:

[0002] When a web is transferred, the web may be shifted toward one edge, thereby shifting the center line of the web from the intended path. in such a case, the shift may be corrected by adjusting the tension on each edge of the web. A web guider known in the art guides a web by a pair of rollers, and the orientation of the rollers with respect to the web can be changed so as to correct the path of the web. For example, a web guider disclosed in European Patent Application No. 0 092 735 corrects the shift of a web by swinging a pair of rollers with a male screw and a female screw meshing with each other.

[0003] However, with the straight male and female screws meshing with each other, it is difficult to properly control the mechanism because of the low linearity between the amount by which the screws are turned and the angle by which the rollers are swung.

SUMMARY OF THE INVENTION

[0004] The present invention has been made in view of the problem in the prior art, and has an object to provide a web guider that is easy to control.

[0005] In order to achieve the object set forth above, the present invention provides a web guider, wherein: an inlet roller for picking up a web and an outlet roller for releasing the web are provided while being spaced apart from each other; a portion of a side surface of each of the pair of rollers is in contact with a surface of the web; a movable section for rotatably supporting the pair of rollers is provided swingably to a fixed section; a driving device for swinging the movable section with respect to the fixed section is provided; an orientation of the pair of rollers with respect to the web is changed as the movable section is swung; the driving device includes a curved rail for guiding the swinging of the movable section, a driver for providing a driving force for swinging the movable section, and a follower for transmitting the driving force from the driver to the movable section, the follower having a shape conforming to the curvature of the rail; and the orientation of the rollers is determined by a position at which the driver contacts the follower.

[0006] As the orientation of the pair of rollers with respect to the web flow direction is changed by swinging the movable section, the tension on each edge of the web changes. Thus, the web is moved along the axes of the rollers, thereby changing the path of the web being transferred.

[0007] On the other hand, the follower for transmitting the driving force from the driver to the movable section has a shape conforming to the curvature of the rail, thereby providing an increased linearity between the amount by which the driver is driven and the angle by which the rollers are swung even if the swing angle of the rollers is increased. Therefore, it is possible to easily and accurately control the swing angle of the rollers.

[0008] Moreover, the driving device includes a curved rail and a follower having a shape conforming to the curvature of the rail, whereby the guider of the present invention can be made smaller, as compared with a case where a set of screws or a joint is used.

[0009] In the present invention, the inlet roller and the outlet roller may be generally parallel to each other. Moreover, the length of each roll may be greater than the width of the web, in which case it is preferred that each end of the roll is extending past the corresponding edge of the web, so that the tension on each edge of the web can be adjusted.

[0010] The pair of rollers may be in surface contact with the same side of the web, or may alternatively be in surface contact with the opposite sides of the web at remote positions so that the web is not sandwiched by the inlet roller and the outlet roller. Note that the inlet roller comes into surface contact with any portion of the web, before the outlet roller does.

[0011] The movable section may be provided swingably with respect to the fixed section along the plane that includes the axes of the pair of rollers. Alternatively, the movable section may be swingable along a plane that is inclined to, or that crosses, the plane, or may be swingable along a plane that is perpendicular to the plane including the axes of the pair of rollers.

[0012] The rail may be curved along a line that is generally an arc whose center is located closer to the inlet roller than to the outlet roller. The term "arc" as used herein is not limited to a portion of a circle, but includes any other arc-like line, e.g., a portion of an ellipse, a parabola, a hyperbola, a sine curve, a cycloid, etc.

[0013] The rail may be fixed to the movable section or to the fixed section. When the rail is fixed to the movable section, a guided member to be guided by the rail is provided on the fixed section. On the other hand, when the rail is fixed to the fixed section, a guided member to be guided by the rail is provided on the movable section.

[0014] The driver and follower mechanism may be a mechanism including a pinion and a curved rack, a worm and worm wheel mechanism, a screw gear mechanism.

[0015] The motor for swinging the frame may be fixed either to the fixed section or the movable section. While the motor may be any of various motors or a solenoid, it is preferred that positional information on the path of the web being transferred is detected by a detector, and

the operation of the motor is controlled according to the detection results.

[0016] In the present invention, an arm may be provided instead of the rail for guiding the swing movement. For example, the base portion of a swingable arm may be attached to the fixed section while the movable section is attached to the tip of the arm so that the movable section and the arm are swung integrally.

[0017] The detector detects a reference position of the web. The opposing edges of the web are typically detected as "reference positions". Alternatively, when a graphical pattern or a picture is printed on the web, it may be detected as a reference position and subjected to an image processing operation so as to generate information on the position of the web.

[0018] The means for detecting the reference position may be an ultrasonic sensor, an optical sensor (e.g., an infrared sensor), an air sensor, etc. Alternatively, the deflection of the web may be detected by processing an image data obtained from a CCD camera or a linear sensor (line sensor).

[0019] A suitable type of a sensor can be selected depending on the type of the web. For example, if an air easily passes through the web, it is preferred to use an ultrasonic sensor or an optical sensor. If the web is transparent or semitransparent, it is preferred to use an ultrasonic sensor or an air sensor.

[0020] Note that the web may be any of various types of web, including a whole cloth for making a disposable worn article such as a disposable diaper, disposable pants, a sanitary napkin, or the like, a whole cloth with apertures, e.g., leg holes, therein, a whole cloth with an elastic member adhered thereto, and a whole cloth with an absorbent layered thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

FIG. **1A** is a perspective view illustrating a web guider according to one embodiment of the present invention, and FIG. **1B** is a perspective view illustrating a first sensor.

FIG. **2A** and FIG. **2B** are a cross-sectional bottom view and a cross-sectional top view, respectively, illustrating the web guider.

FIG. **3A** to FIG. **3C** are schematic plan views illustrating a method for adjusting the path of a web.

FIG. **4A** and FIG. **4B** are cross-sectional side views each illustrating the web guider.

FIG. **5** is a schematic diagram illustrating the configuration of the web guider.

FIG. **6A** and FIG. **6B** are plan views each illustrating a display screen of a display.

FIG. **7** is a schematic side view illustrating a variation of the embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] An embodiment of the present invention will now be described with reference to the drawings. As illustrated in FIG. **1A**, a web guider **2** includes a movable section **5** and a fixed section **6**.

[0023] The movable section **5** includes an inlet roller **30** for picking up a web **W**, and an outlet roller **31** for releasing the web **W**. The rollers **30** and **31** rotatably attached to the movable section **5** while being spaced apart from each other by a predetermined interval. The web **W** runs around the pair of rollers **30** and **31**, and is released from the web guider **2** while being in contact with each part of side surfaces of the inlet roller **30** and the outlet roller **31**.

[0024] As illustrated in FIG. **1A**, each length of the rollers **30** and **31** is set to be greater than the width Ww of the web **W**. On the other hand, the distance D between the outer edges of the pair of rollers **30** and **31** is set to be 1/2 or more of the width Ww of the web **W**. Note that the distance D between the outer edges of the pair of rollers **30** and **31** is preferably equal to or greater than the width Ww of the web **W**. The rollers **30** and **31** are preferably made of a light material, e.g., an aluminum alloy or a carbon graphite.

[0025] The movable section **5** illustrated in FIG. **1A** can be rotated with respect to the fixed section **6**. The rotation of the movable section **5** changes the orientation of the rollers **30** and **31** with respect to the web **W**, thereby correcting the path of the web **W** being transferred.

[0026] As illustrated in FIG. **2A** and FIG. **2B**, the movable section **5** includes a rail **50** for changing the orientation of the movable section **5**. The rail **50** may be in an arc shape or a U-shape. When the rail **50** is in an arc shape, the movable section 5 is driven about the center O of the arc (FIG. **3A** and FIG. **3B**). In such a case, the rail **50** is curved so as to protrude toward the outlet roller **31**.

[0027] In order to prevent the web **W** from being creased, it is preferred that the center O is located closer to the inlet roller **30** than to the outlet roller **31**. Moreover, as illustrated in FIG. **3A**, it is most preferred that the center O is located along one edge of the inlet roller **30** that is away from the outlet roller **31**.

[0028] In a case where the center O is located on one edge of the inlet roller **30** that is away from the outlet roller **31** as illustrated in FIG. **3A**, as compared to a case where it is located at the center of the inlet roller **30** as illustrated in FIG. **3B**, the change in the position at which the web **W** is picked up is smaller, thereby better preventing the web **W** from being creased.

[0029] As illustrated in FIG. **4A** and FIG. **4B**, the fixed section **6** includes a plurality of guide rollers **62**, a support section **60** for supporting the guide rollers **62** and a motor **M**. The guide rollers (guided members) **62** are rotatably attached to the support section **60**. The rail **50** is

held between the guide rollers **62** for movement along a constant path. Thus, the rail **50** can move between the guide rollers **62** under a small frictional force. In the present embodiment illustrated in FIG. **2A** and FIG. **2B**, the rail **50** is held by four guide rollers **62**. With the rail **50** being held by the guide rollers **62**, the rail **50** can move along the predetermined arc about the center O (FIG. **3A**) without being shifted substantially.

[0030] The motor **M** includes a driver **61** for providing a driving force for swinging the movable section **5**. The driver **61** transmits the driving force from the motor **M** to a follower **51**. The orientation of the rollers **30** and **31** is determined by the position at which the driver **61** and the follower **51** contact each other. The follower **51** may be provided with substantially the same location as the rail **50** with substantially the same curvature.

[0031] Specifically, the follower **51**, i.e., a rack **51** may be provided along the rail **50**, as illustrated in FIG. **2B**. Moreover, the motor **M** may be fixed to the support section **60**, with a pinion (driver) **61** provided along the output shaft of the motor **M** being engaged with the rack **51**. As the pinion **61** is spun by the motor **M**, the rack **51** is moved, whereby the movable section **5** swings to the left and to the right about the center O. Therefore, the orientations of the rollers **30** and **31** provided on the movable section **5** are determined accurately by the position of a gear (engaging portion) of the rack **51** that meshes with the pinion **61**. Note that the shape of the rack does not have to be straight, but may alternatively be a curved shape, e.g., an elliptical shape, a parabolic shape, or an arc shape.

[0032] The motor **M** may be a stepping motor. By spinning the motor **M**, the rollers **30** and **31** are swung by a predetermined angle. The predetermined angle may be in the range of -20° to +20°.

[0033] Note that the rack 51 may be provided either on the protruding side of the rail **50** or on the other side (i.e., the side closer to the center O). However, it is preferred that the rack **51** is provided on the protruding side of the rail **50** in order to give a large torque on the movable section **5**.

[0034] With the provision of the rack **51** along the rail **50**, the linearity between the amount by which the motor **M** is spun and the angle by which the movable section **5** is swung is increased, as compared with a case where a joint, or the like, is used. Therefore, even if the swing angle of the rollers **30** and **31** is large, it is possible to accurately control the swinging of the movable section **5**.

[0035] Moreover, with the provision of the rack **51** along the arc-shaped rail **50**, the swing angle of the rollers **30** and **31** can be increased, as compared with a case where a joint, or the like, is used, as disclosed in United States Patent No. 4,212,419. Thus, the swinging of the rollers **30** and **31** can be controlled over a wide angle range, thereby allowing for a substantial correction of the path of the web **W**. Furthermore, the guider of the present invention can be made smaller, as compared with a case where a set of screws or a joint is used.

[0036] As illustrated in FIG. **5**, the web guider **2** may include a sensor for detecting a reference position of the web **W**, based on which the path of the web **W** being transferred is defined, so as to output positional information on the detected path, and a controller **10** for controlling the spinning of the motor **M** based on the positional information from the detector.

[0037] Specifically, the controller **10** may be a microcomputer including a CPU **10a** and a memory **10b**. At least a first sensor (detector) **41**, the motor **M**, and a display **7** to be described later are coupled with the controller **10** via an interface (not shown). Alternatively, the motor **M** may be controlled by the controller **10** based on instructions from an external controller.

[0038] It is preferred that the first sensors (detectors) **41** are provided downstream of the outlet roller **31**, and between the outlet roller **31** and the next roller (not shown) downstream of the outlet roller **31**, as illustrated in FIG. **1A**. This is because if the first sensors (detectors) **41** are provided downstream of the next roller, the movement of the web **W** in the width direction is decreased. Note that it is more preferred that the first sensors **41** are provided at a position closer to the outlet roller **31** between the outlet roller **31** and the next roller.

[0039] The first sensors **41** can detect the position of the web **W**. The amount by which the web **W** is shifted can be determined by detecting an edge (reference position) of the web **W** with the first sensor **41**, for example.

[0040] The controller **10** illustrated in FIG. **5** has a manual mode in which the path of the web **W** is adjusted manually by the operator, and an automatic mode in which it is adjusted automatically by the controller **10** as will be described later.

[0041] In the automatic mode, the controller **10** may control the path of the web **W** as follows by using the pair of first sensors **41**. For example, the first sensor **41** may include a light emitting section **Sa** for emitting light and a light receiving section **Sb** for receiving light from the light emitting section **Sa**, as illustrated in FIG. **1B**.

[0042] One of the pair of first sensors **41** illustrated in FIG. **1A** detects one edge of the web **W**, and the other one detects the other edge of the web **W**. In such a case, the path of the web **W** may be adjusted as follows . That is, the controller **10** may control the path of the web **W** so that the value of the detection signal (positional information) output from one of the first sensors **41** is equal to that output from the other one of the first sensors **41**. When the path of the web **W** changes, i.e., deflects to either side, the amount of light received by the light receiving section **Sb** changes according to the degree of the deflection. The controller **10** may control the spinning of the motor **M** based on the change in the amount of received light.

[0043] For example, as illustrated in the conceptual diagram illustrated in FIG. **3C**, when the web **W** is shifted to the left (the direction indicated by arrow L), the

amount of light received by the left-side first sensor **41** decreases while the amount of light received by the right-side first sensor **41** increases. According to the detection signals from the first sensors **41**, the controller **10** spins the motor **M** to swing the rollers **30** and **31** clockwise as illustrated in FIG. **3A**, thereby moving the path of the web **W** to the right (the direction indicated by arrow R).

[0044] Note that only one first sensor **41** may be provided, instead of providing a pair of first sensors **41**, to detect only one edge of the web **W**. In such a case, the path of the web **W** can be adjusted as follows, assuming that the first sensor **41** is an optical sensor.

(1) The operator performs a predetermined operation to record, in the controller **10**, a value L_{MAX} of the detection signal that is output from the light receiving section **Sb** of the first sensor **41** when the light receiving section **Sb** is not covered by the web **W** at all.

(2) Then, a value L_{MIN} of the detection signal that is output from the light receiving section **Sb** when the light receiving section **Sb** is completely covered by the web **W** is recorded in the controller **10**.

(3) The controller **10** determines the display range of the detection signal based on the recorded values L_{MAX} and L_{MIN}. The controller **10** can display the value of the signal output from the light receiving section **Sb** on the display **7** to be described later in the determined display range. The operator adjusts the position of the first sensor **41** with respect to the web **W** so that the value of the detection signal becomes equal to the average value between L_{MAX} and L_{MIN} is obtained.

(4) The controller **10** outputs a control signal such that a level L_R of an actual detection signal output from the light receiving section **Sb** is between L_{MAX} and L_{MIN}, and the motor **M** is spun based on the control signal. For example, a value C of the control signal may be obtained as shown in Expression (1) below:

$$C=A*(L_R-L_{STN}) \quad (1)$$

where L_{STN} is the average value between L_{MAX} and L_{MIN}, and A is a constant.

[0045] Although the light receiving section of an optical sensor typically has a round shape (for example, United States Patent No. 5,300,787, United States Patent No. 5,379,656, and United States Patent No. 5,442,187), the light emitting section and the light receiving section of the optical sensor may alternatively has an oblong shape. It is preferred that the light emitting section emits light having a desirable coherence. Poor phase or straightness of light may become a disturbance that hinders the improvement of the measurement accuracy. In view of this, a bundle of optical fibers may be provided so that the emitted light is passed therethrough. Alternatively, the light emitting section may be divided into a plurality of regions so that light is emitted from the plurality of regions successively at regular intervals, thereby avoiding interference of light emitted from adjacent light emitting devices to improve the measurement accuracy. Alternatively, light maybe emitted from the light emitting section via a filter capable of making the emitted light coherent. Note that emitted light does not have to be visible light.

[0046] Moreover, the first sensor **41** may include a cleaner for cleaning the light receiving section and/or the light emitting section. For example, a spec of dust attached to the light receiving section or the light emitting section may be blown off with air by the cleaner. For example, the first sensor **41** illustrated in FIG. **1B** may include an aperture **8** or a gap through which the air is blown in the direction in which the web **W** runs or in the opposite direction. The air is blown continuously or intermittently by the controller **10**. In a case where the air is blown intermittently, the controller **10** may control the air blow so that the air is blown periodically or randomly. Note that if the air is blown through an aperture , or the like , an orifice effect is obtained.

[0047] The web guider **2** may further include the display **7**. Specifically, the display **7** may be coupled with the controller **10** illustrated in FIG. **5**. The display **7** may be a liquid crystal display or a plasma display. An operation screen (FIG. **6A**), a settings screen (FIG. **6B**), etc., may be displayed on the display **7**.

[0048] As illustrated in FIG. **6A**, on the operation screen of the display **7**, an automatic mode button **70**, a manual mode button **71**, a left sensor button **72**, a right sensor button **73**, a setting button **74**, shift amount display areas **76**, swing buttons **77**, etc., are displayed. On the setting screen illustrated in FIG. **6B**, a numeric keypad **75**, etc., are displayed.

[0049] The display **7** may be provided on the fixed section **6** illustrated in FIG. **1A**, or separately from the fixed section **6**. Note that it is preferred that the display **7** is provided within 1.5 m from the web guider **2**, which displays information of the first sensor **41**. When the display **7** is excessively remote from the web guider **2**, and if a wired data line is used, noise is likely to be introduced to the data line. Moreover, the display **7** may be a touch screen.

[0050] The controller **10** illustrated in FIG. **5** may measure the amount by which the rail **50** is moved. For example, the motor **M** may output a predetermined signal each time the motor **M** is spun by a predetermined amount (e.g., a number of turns, which may be less than one) , and the controller **10** may count the number of the predetermined signals, thereby measuring the amount by which the rail **50** is moved. Alternatively, the controller **10** may determine the position of the rail **50** by detecting a mark on the rail **50**. For example, a second sensor for

reading such a mark put on the rail **50**, and the controller **10** may receive positional information from the second sensor. Particularly, the mark may indicate the limit to which the movable section **5** can be swung. In such a case, the controller **10** may stop the spinning of the driving unit when the second sensor detects the limit.

[0051] The operation of the web guider, where optical sensors are used as the pair of first sensors **41**, will now be described.

[0052] First, the operation of the web guider **2** in an automatic mode will be described.

[0053] Before the operation in the automatic mode, the operator calibrates the first sensors **41**. Note that once the calibration of the position of the first sensors **41** is done, it does not have to be performed again unless a web of a different width is used.

[0054] The first sensors **41** are operated to perform the detection operation while the web **W** is not passed around the rollers **30** and **31**. Then, the web **W** is passed around the rollers **30** and **31**, and the first sensors **41** are moved to positions at which both edges of the web **W** can be detected by the first sensors **41**, according to the width Ww of the web **W**. The operator calibrates the positions of the first sensors **41** based on the positions of the edges of the web **W** displayed on the shift amount display areas **76** illustrated in FIG. **6A**.

[0055] The operator may perform a predetermined operation to have the setting screen illustrated in FIG. **6B** displayed, and change the preset initial values by using the numeric keypad **75**. On the setting screen, various settings can be changed, e.g., the sensor detection width, the shift upper limit, the dead zone, etc. The sensor detection width is a value associated with the width of an edge of the web **W** to be detected by the first sensors **41**. The shift upper limit is a value based on which the motor **M** is controlled so that the corrected path of the web **W** is not beyond the detection range of the first sensors **41**. The dead zone is a value representing the range (guiding point) in which the first sensors **41** perform the detection operation.

[0056] Then, the operator touches the automatic mode button **70**, and the sensor buttons **72** and **73** to initiate the transfer of the web **W**. Note that in a case where only one of the pair of first sensors **41** is used, only one of the left and right sensor buttons **72** and **73** is touched.

[0057] According to the detection signals from the first sensors **41**, the controller **10** spins the motor **M** to swing the rollers **30** and **31** to the left and to the right to correct the path of the web **W**. For example, when the web **W** is shifted to the left as illustrated in FIG. **3C**, the controller **10** spins the motor **M** so as to swing the rollers **30** and **31** illustrated in FIG. **3A** in the clockwise direction (i.e., a direction opposite to the direction in which the web **W** is shifted) to move the path of the web **W** to the right. On the other hand, when the web **W** is shifted to the right, the rollers **30** and **31** are swung in the counterclockwise direction (i.e., a direction opposite to the direction in which the web **W** is shifted) to move the path of the web **W** to the left. The controller **10** repeatedly swings the rollers **30** and **31** to correct the path of the web **W** according to the detection signals from the first sensors **41**.

[0058] Thus, the rollers **30** and **31** of the movable section **5** are swung according to the amount by which the web **W** is shifted, which is detected by the first sensors **41**, and the tension on each edge of the web **W** is controlled by the rollers **30** and **31**, thereby correcting the path of the web **W**.

[0059] As necessary, the operator operates the web guider **2** in the manual mode. As the operator touches the manual mode button **71** on the display **7**, the CPU **10a** is set in the manual mode. The operator touches the right or left swing button **77** to swing the rollers **30** and **31** so as to correct the path of the web **W**.

[0060] Note that the web **W** may be passed around the rollers **30** and **31** in an N- or S-shaped pattern as illustrated in FIG. 7.

[0061] As described above, according to the present invention, the follower for transmitting the driving force from the driver to the movable section has a shape conforming to the curvature of the rail, thereby providing an increased linearity between the angle by which the rollers are swung and the amount by which the driver is driven even if the swing angle of the rollers is increased. Therefore, it is possible to easily and accurately control the swing angle of the rollers.

[0062] Particularly, with the center about which the movable section is swung being located closer to the inlet roller than to the outlet roller, the displacement of the inlet roller, occurring when the orientation of the inlet roller is changed, can be reduced, thereby reducing the creasing of the web.

[0063] Moreover, with the provision of a guide rail curved in an arc shape, the swinging of the movable section can be realized simply and reliably.

[0064] Moreover, if the shift in the path of the web is detected, and the motor is controlled based on the detection output, so that the shift can be corrected automatically, the web guider can run in a continuous, automated operation.

[0065] Furthermore, if the detected shift amount of the web is displayed on the display, the position at which to place the detector can be known easily, thereby significantly facilitating the operation and maintenance of the apparatus.

[0066] Moreover, since the web is transferred along a generally U-shaped path, the motor, etc., can be placed in the space inside the generally U-shaped path, thereby improving the space efficiency. Furthermore, if the operation section is provided on one side of the space, operations such as an initial setting operation can be performed while visually observing the shift of the web, thereby significantly improving the operability of the web guider with respect to the various setting operations.

Claims

1. A web guider, comprising:

   a movable section (5) that has an inlet roller (30) for picking up a web, an outlet roller (31) for releasing the web, and a curved rail (50); and
   a fixed section (6) that has a guider for guiding the curved rail (50) and a motor (M) for providing a driving force for swinging the movable section (5);

   wherein the motor (M) transmits the driving force through a driver (61) of the motor (M) to a follower (61) of the curved rail (50), and
   wherein an orientation of the movable section (5) is changed by changing a position at which the driver (61) contacts the follower (61).

2. The web guider according to claim 1, wherein the driver (61) and the follower (61) are provided with an engaging portion for preventing slipping therebetween.

3. The web guider according to claim 2, wherein a center about which the movable section (5) is swung is located closer to the inlet roller (30) than to the outlet roller (31).

4. The web guider according to claim 3, wherein the rail (50) is curved along a line that is generally an arc.

5. The web guider according to any one of claims 1 to 4, wherein a length of each of the inlet roller and outlet roller (30, 31) is greater than a width of the web, and a distance between outer edges of the inlet and outlet rollers (30, 31) is set to be 1/2 or more of the width of the web.

6. The web guider according to any one of claims 1 to 5, further comprising:

   a detector (41) for detecting a reference position of the web, based on which a path of the web is defined, the detector (41) configured to output positional information associated with the defined path; and
   a controller (10) for controlling the motor (M) for swinging the movable section (5) based on the positional information.

7. The web guider according to claim 6, wherein:

   the detector (41) is operable to detect an amount by which the web is shifted in a width direction of the web; and
   the web guider further comprises a display for displaying the shift amount.

8. The web guider according to claim 6, wherein:

   an operation section (7) with which the controller (10) is operated is provided on one side of the fixed section (6).

9. A web guider apparatus, comprising:

   a moveable section (5) comprising an inlet roller (30) operable to pick up a web, an outlet roller (31) operable to release the web, and a curved rail (50), wherein the curved rail (50) further comprises a follower (61), and wherein a curvature of the follower (61) is associated with a curvature of the curved rail (50); and
   a fixed section (6) comprising a plurality of guide rollers , a motor (M), and a driver (61),

   wherein the driver (61) is in operable engagement with the follower (61),
   wherein the motor (M) is operable to provide a driving force to the driver (61),
   wherein the moveable section (5) is operable to rotate with respect to the fixed section (6), wherein the rotation of the moveable section (5) is substantially linearly proportional to the driving force, and
   wherein the plurality of guide rollers are operable to guide the curved rail (50) along a predetermined path associated with the curvature of the curved rail (50).

10. The web guider apparatus of claim 9, further comprising an engaging portion associated with the driver (61) and the follower (61), wherein slippage is generally prevented between the driver (61) and the follower (61).

11. The web guider apparatus of claim 10, wherein the follower (61) comprises a rack and the driver (61) comprises a pinion.

12. The web guider apparatus of claim 9, wherein the rotation of the moveable section (5) with respect to the fixed section (6) is along a generally arc-shaped line.

13. The web guider apparatus of claim 9, wherein the moveable section (5) is rotated about a center point associated with the fixed section (6), and wherein the center point is located closer to the inlet roller (30) than the outlet roller (31).

14. The web guider apparatus of claim 13, wherein the center point is located along an edge of the inlet roll-

er (30) that is farthest from the outlet roller (31).

15. The web guider apparatus of claim 9, wherein a length of the inlet roller (30) and the outlet roller (31) is greater than a width of the web, and wherein a distance between an outer edge of the inlet roller (30) and an outer edge of the outlet roller (31) is at least one half of the width of the web.

16. The web guider apparatus of claim 9, further comprising:

a detector (41) operable to detect a reference position of the web, the detector (41) further being configured to output positional information associated with a path of the web, wherein the path of the web is defined by the detector (41) based on the reference position; and
a controller (10) operable to control the motor (M), wherein the driving force is controlled based on the position information.

17. The web guider apparatus of claim 16, wherein the reference position comprises a position of an edge of the web.

18. The web guider apparatus of claim 16, further comprising a display, wherein the detector (41) is operable to detect an amount by which the web is shifted in a width direction of the web, and wherein the display is operable to display the shifted amount.

19. The web guider apparatus of claim 18, wherein the display further comprises an operation screen, wherein the operation screen is operable to provide operator input to the controller (10).

20. The web guider apparatus of claim 19, wherein the operation screen is located on one side of the fixed section (6).

FIG.1A

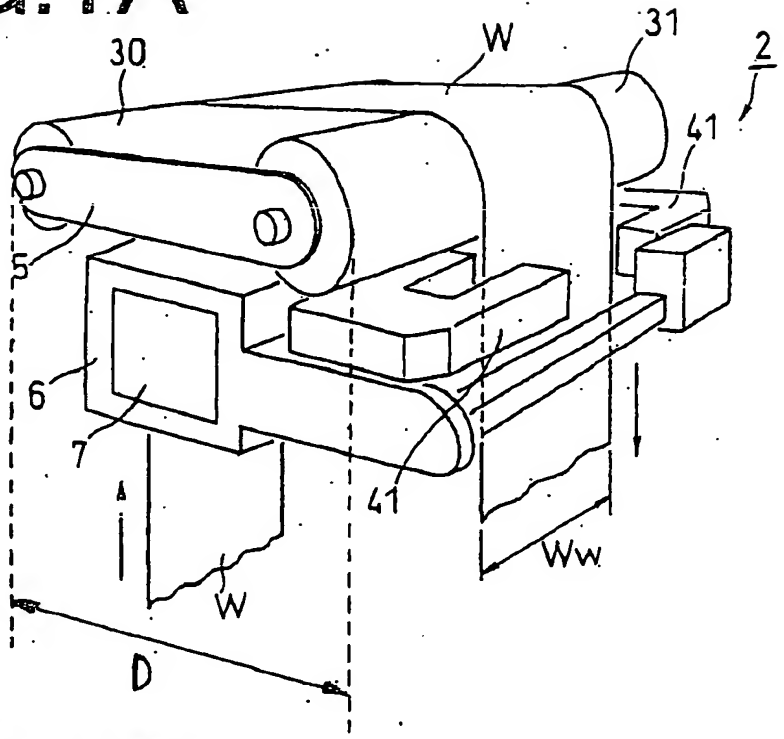


FIG.1B

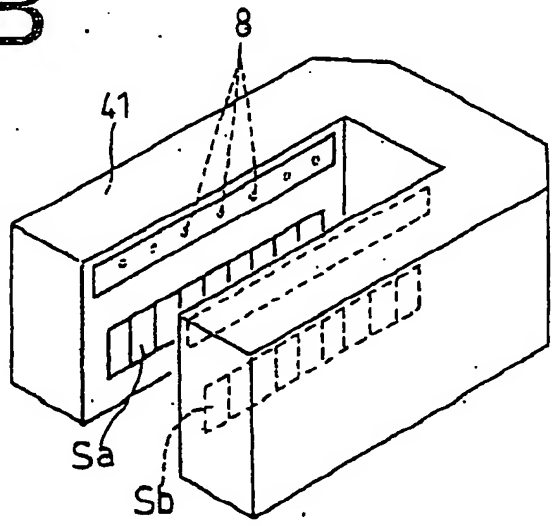


FIG.2A

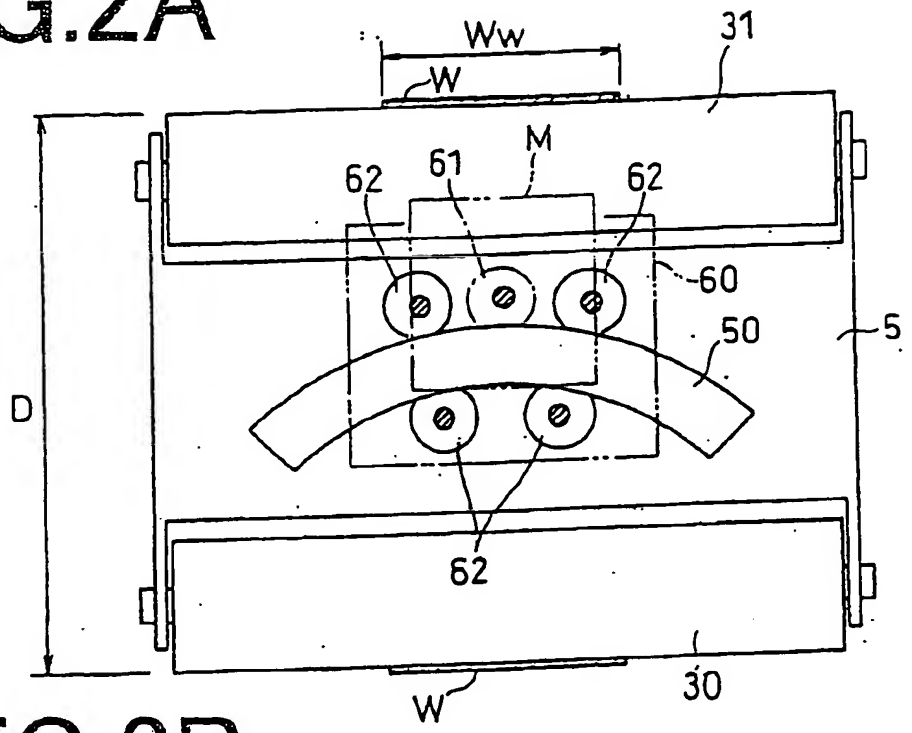


FIG.2B

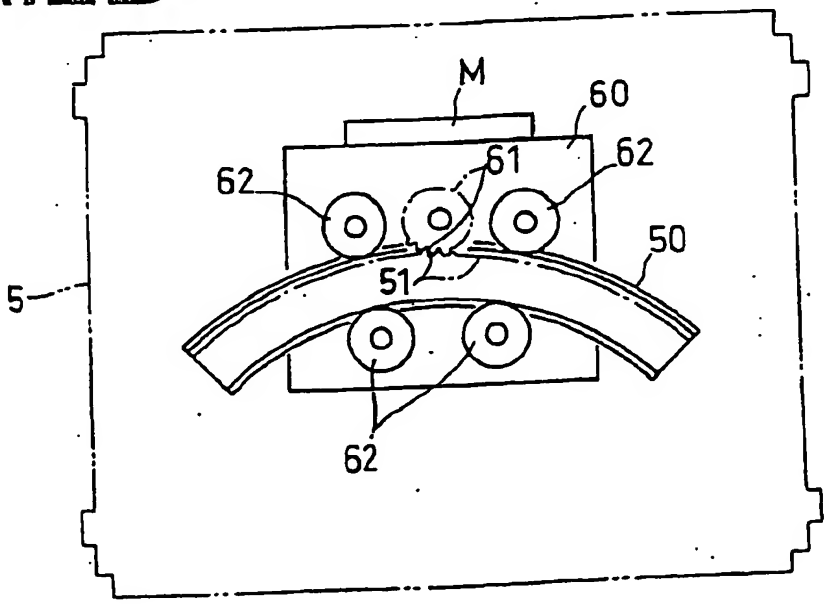


FIG.3A

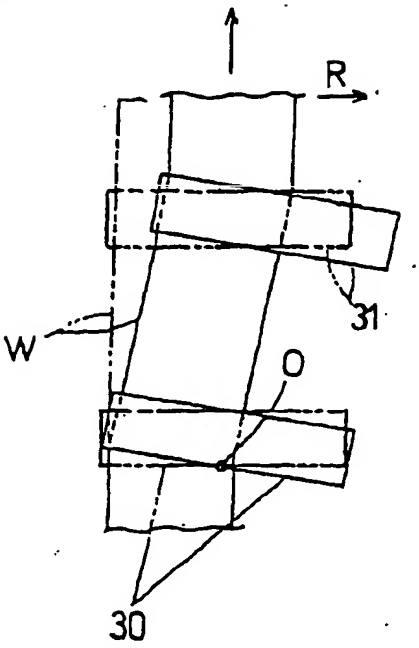
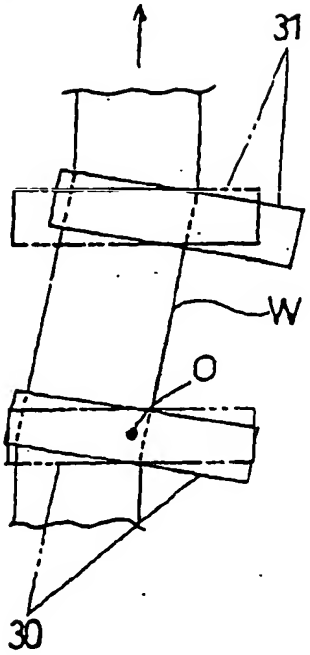


FIG.3B



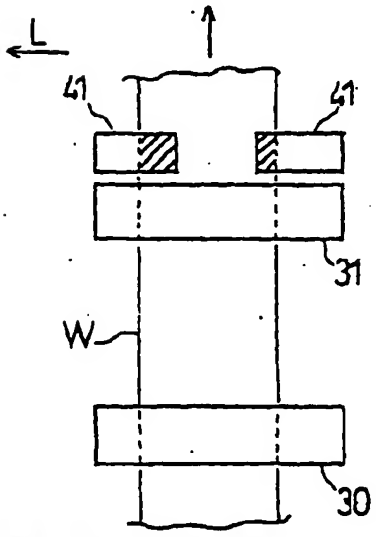


FIG.3C

FIG.4A

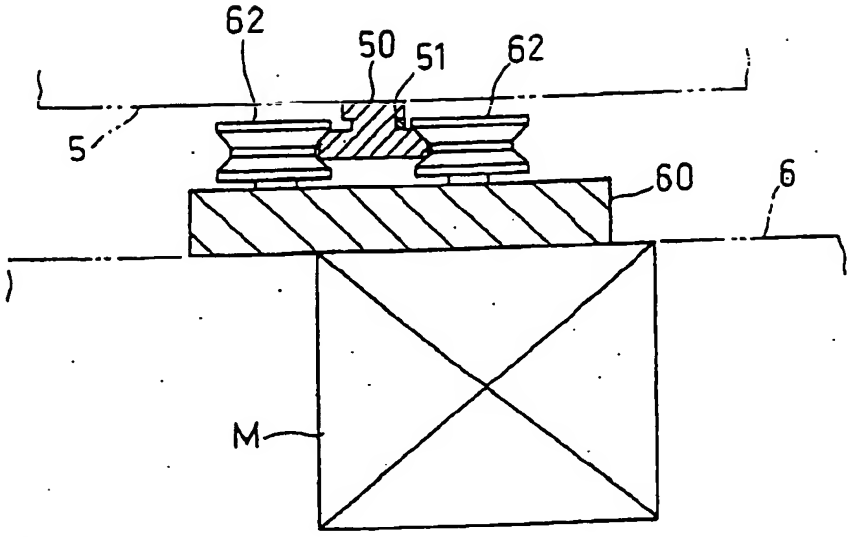
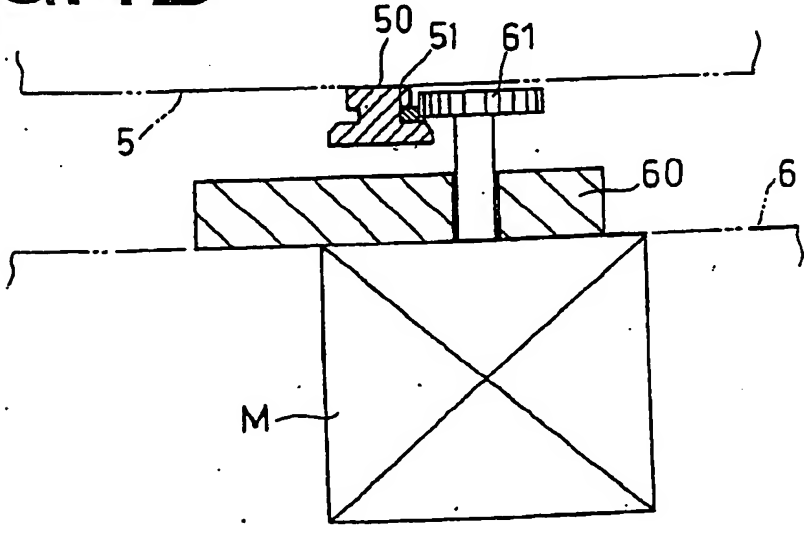


FIG.4B



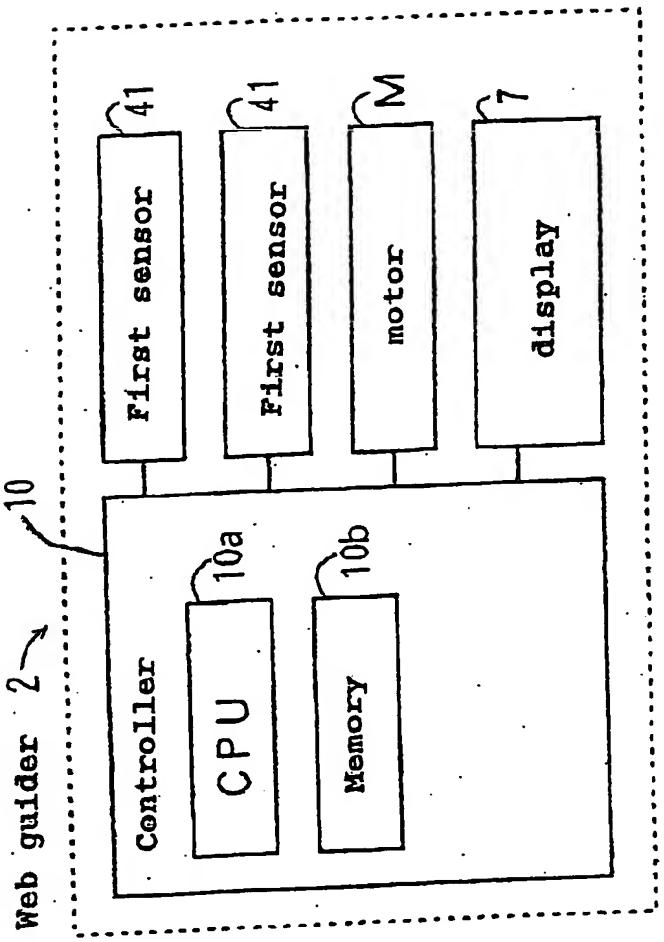

Web guider
2
10
Controller
CPU
10a
Memory
10b
First sensor
41
First sensor
41
motor
M
display
7

FIG.5

FIG.6A

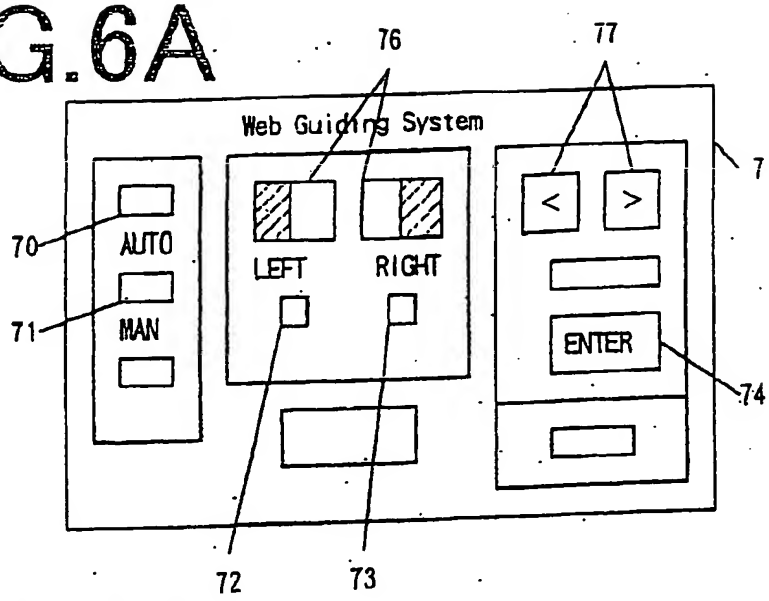

76
77
Web Guiding System
7
70
AUTO
71
MAN
LEFT
RIGHT
<
>
ENTER
74
72
73

FIG.6B

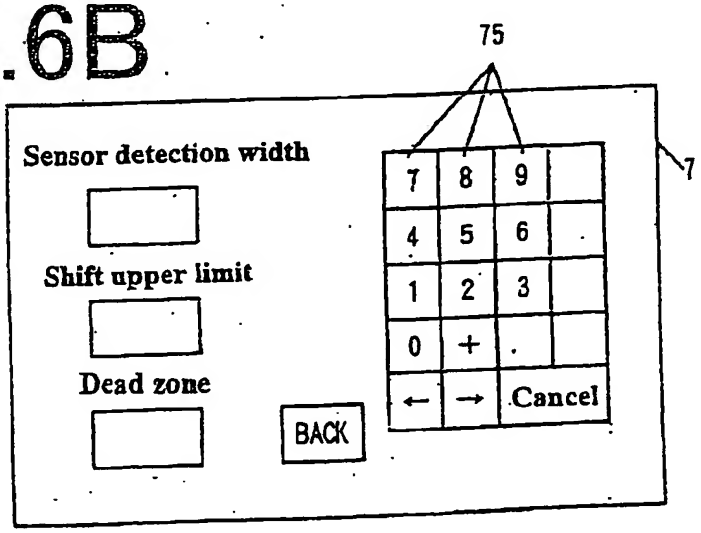
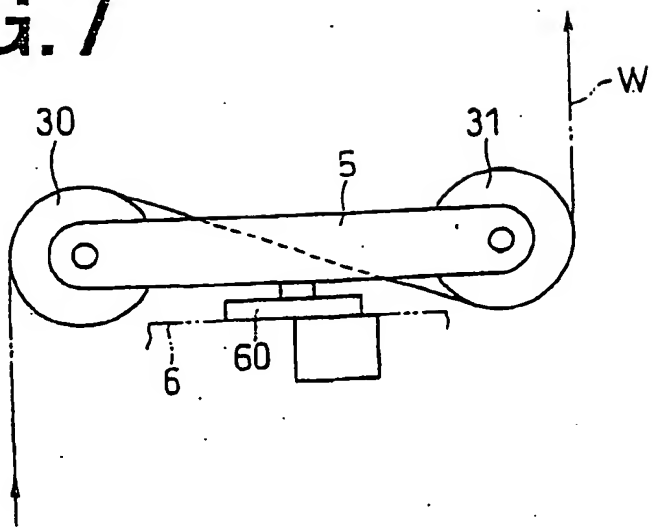

75
Sensor detection width
7
8
9
4
5
6
1
2
3
0
+
.
Shift upper limit
Dead zone
←
→
Cancel
BACK
7

FIG.7



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